Maternal Feeding Practices and Child Nutritional Outcomes in Primary Health Care Settings in Rivers State, Nigeria. A Clinical Epidemiological Approach

Abstract

Background: Child malnutrition remains a critical public health challenge in Nigeria. Maternal knowledge and feeding practices play important roles in improving child nutrition outcomes. The study used a clinical epidemiological approach to assess maternal compliance with recommended feeding practices and its association with child nutritional outcomes in six primary healthcare (PHC) centres in Rivers State, Nigeria.

Methods: An analytical cross-sectional study was conducted among 410 mothers attending the six PHCs for three months (January 20th, 2025, to April24th, 2025). Data were collected on sociodemographic characteristics, knowledge, compliance with feeding guidelines, and child nutritional status. Multivariate logistic regression identified predictors of maternal compliance with child feeding practices.

Results: Mean maternal age was 29.6 ± 5.4 years. Many mothers had secondary or higher education (63.4%), and 76.1% were multiparous. Compliance with feeding guidelines was 51.7%. Children's nutritional indicators showed 29.8% stunting and 18.2% underweight. The predictors of maternal compliance were high maternal knowledge (Adjusted Odds Ratio [AOR]=2.31; 95% CI: 1.54-3.46; p<0.001), secondary education or higher (AOR=1.87; 95% CI: 1.21-2.88; p=0.005), and household food availability (AOR=2.69; 95% CI: 1.76-4.10; p<0.001). Attendance at PHC follow-up visits showed a positive trend (AOR = 1.45; 95% CI: 0.94-2.26), but this was not statistically significant (p = 0.084).

Conclusion: Maternal education, knowledge, and household food availability are key to improving child nutrition. Interventions should improve understanding and access to resources.

Keywords: Maternal compliance, Child nutrition, Feeding practices, Nigeria, Primary health care

1. Introduction

Malnutrition among children remains a widespread and complex public health challenge, especially in low- and middle-income countries (LMICS) such as Nigeria. Estimates reveal that 38.9 million children under five are overweight, 45 million are wasted, and 149 million are stunted worldwide.[1] Malnutrition impedes growth and economic productivity across populations and accounts for nearly half of all deaths in children under five.[2] Despite numerous interventions and policy frameworks aimed at combating undernutrition, malnutrition rates in Nigeria remain alarmingly high, particularly among children in rural and underprivileged areas.

The first 1,000 days, from conception to a child's second birthday, constitute a crucial period for development. Nutritional deficiencies during this time can lead to irreversible physical and cognitive impairments.[3] Undernutrition in infancy increases vulnerability to infections, hampers academic success, and diminishes long-term economic potential.[4] Child nutritional outcomes are strongly influenced by maternal feeding practices, which are shaped by knowledge, cultural norms, education, and socioeconomic factors.[5] WHO and UNICEF's Infant and Young Child Feeding (IYCF) guidelines recommend exclusive breastfeeding for the first six months, followed by the introduction of safe, nutrient-rich complementary foods, and continued breastfeeding for at least two years.[1] In many parts of Nigeria, compliance with these recommendations remains below ideal levels despite awareness campaigns.[6]

Numerous studies have demonstrated a strong link between children's nutrition and the fact that children with better anthropometric scores also had mothers with higher knowledge levels, who were more likely to follow recommended IYCF practices.[7] Similarly, maternal education in Nigeria has been positively linked with improved feeding practices and child nutritional indicators.[8] Nonetheless, structural barriers such as food insecurity, limited access to healthcare services, and entrenched gender norms restricting women's autonomy often hinder the translation of knowledge into consistent practice.[9]

The inadequate health infrastructure, particularly in rural primary healthcare (PHC) settings where preventive and promotional services are frequently understaffed and underfunded, exacerbates the malnutrition problem. The PHC system, designed to serve as the initial point of contact for healthcare within the national health architecture, is vital for delivering maternal and child health interventions. However, research on the effectiveness of PHC-based nutritional education and support remains limited.

2.1 Study Design

This study was an analytical cross-sectional design to assess the clinical epidemiological factors influencing maternal compliance with recommended feeding practices and their association with child nutritional outcomes. The study was forthree months (January 20th, 2025, to April24th, 2025).

2.2 Study Setting

The study was conducted in six PHC centres in three Local Government Areas (LGAs) in Rivers State, namely Obio/Akpor, Oyigbo and Eleme LGAs. Rivers State is in the South-South geopolitical zone of Nigeria and has a diverse population spread across urban, peri-urban, and rural-riverine areas. It has twenty-three LGAs, with varying population densities, socioeconomic profiles, and healthcare coverage. Port Harcourt, the state capital, is an important industrial and economic hub with major seaports and oil companies. Rivers State has an estimated population of nine million with an annual growth rate of 3.2% as of 2025. Port Harcourt, the State capital, has an estimated population of 3 million. This is due to urbanisation and economic opportunities in the oil and gas sector. The state's economy is driven by the oil and gas industry, which includes multinational companies. Traditional occupations include subsistence farming, fishing,

and aquaculture, especially in the riverine communities. A proportion of the workforce serves in administrative positions for the State and Federal Governments. The PHC system in the State operates as the frontline structure in Nigeria's National Health system, providing preventive and curative services to local populations, especially mothers and children.

2.3 Study Population

The target population was mothers aged 18-49 years with children between 6 months and 59 months old who were attending immunisation and child welfare clinics at the six PHC centres.

2.4 Sample Size Determination

The minimum sample size (n) was calculated using the Cochran formula for a single proportion:

$n = Z^2pq / e^2$

Where:

Z = 1.96 (standard normal deviation at 95% confidence level).

p = estimated proportion of maternal compliance (50% due to unavailable prior data).

q = 1- p.

e= margin of error (0.05).

$n = (1.96)^2 \times 0.5 \times 0.5 / (0.05)^2 = 384$.

Adjusting for a 10% non-response rate: 384/1-0.1=384/0.9 = 427.

However, a total of 410 valid responses were analysed after data cleaning.

2.5 Sampling Technique

A multistage sampling technique was used to select study participants from the target population. It had three stages:

Stage 1 Selection of Local Government Areas (LGAs)

A simple random sampling method was used to select three LGAs from the list of twenty-three LGAs in the state through balloting. The selected LGAs were Obio/Akpor, Etche, and Oyigbo LGAs.

Stage 2 Selection of Primary Health Care Centres

Within each selected LGA, a list of all operational PHC centres offering maternal and child health services was obtained from the Rivers State Primary Health Care Management Board. From this list, two PHC centres from each LGA were randomly selected using simple random sampling by balloting to give a total of six PHCs. The selected PHCs were the Model Primary Healthcare Centre (MPHC) at Rumuigbo and Rumuolumeni in Obio/Akpor LGA; MPHC at Odufor, and Akwa in Etche LGA; MPHC at Mirinwanyi, and Obete in Oyigbo LGA.

Stage 3 Participant Recruitment within PHC Centres

At each PHC centre, systematic random sampling was used to recruit eligible mothers. Clinic registers from the child welfare and immunisation sessions were used to estimate the average daily turnout. Using this estimate and the sample size quota for each facility, the sampling interval of every 5th eligible mother was determined.

On each clinic day, data collectors approached every 5th mother meeting the inclusion criteria. If a selected mother declined participation or was ineligible, the next eligible respondent was approached.

2.6 Sample Allocation

The total sample size of 410 was proportionally allocated across the six selected PHCs based on average monthly attendance figures, ensuring fair representation across sites.

2.7 Eligibility

2.7.1 Inclusion Criteria:

1. Mothers aged 18 years and above.
2. Having a child between 6 and 59 months.
3. Attending routine services (immunisation, growth monitoring, child welfare).
4. Resident in the community for a minimum of 12 months.
5. Provided written informed consent or verbal consent.

2.7.2 Exclusion Criteria:

1. Children with congenital or chronic conditions that affect growth.
2. Visitors or non-resident caregivers.

2.8 Data Collection Instruments

2.8.1 Questionnaire

A structured interviewer-administered questionnaire was adapted from WHO IYCF guidelines and validated tools used in prior nutritional studies. It comprised sections on sociodemographic characteristics, maternal knowledge of feeding practices, compliance with IYCF recommendations, and household food security. The questionnaire was pretested on 30 mothers at MPHC Akpajo in Eleme LGA, which is outside the study LGAs, to ensure clarity and reliability.

2.8.2Anthropometric Measurements

Child height/length was measured using a portable stadiometer or infantometer (for children under 2 years), and weight was measured using a standardised digital scale. The height-for-age z-scores (HAZ) and weight-for-age z-scores (WAZ) were calculated using WHO Anthro software to determine stunting and underweight, respectively.

2.9 Operational Definitions

Compliance with feeding guidelines was defined as adherence to core IYCF practices

appropriate for the child's age, including exclusive breastfeeding for infants under six months and timely, appropriate complementary feeding for older children. High maternal knowledge was defined as a score ≥75% on the IYCF knowledge section. Food security was assessed using the Household Food Insecurity Access Scale (HFIAS).

2.10 Data Management

Data management procedures were implemented to ensure accuracy, confidentiality, and integrity of the information collected during the study. All data were handled in accordance with ethical standards and established research protocols.

2.10.1 Data Collection and Entry

Data were collected using a structured, interviewer-administered questionnaire and anthropometric measurement tools. Four field data collectors, who received training before the study, verified questionnaire completeness and accuracy immediately after each interview. Each completed form was checked for consistency and missing values before being accepted.

Data were double-entered into Microsoft Excel 365 by two independent data entry clerks to minimise entry errors. A comparison of the two datasets was carried out, and discrepancies were resolved by referring to the original questionnaires.

2.10.2 Data Cleaning and Coding

Following the entry, the dataset was cleaned to remove inconsistencies, duplicates, and outliers. Categorical variables (e.g., maternal education, feeding knowledge level) were coded numerically for statistical analysis. Continuous variables (e.g., maternal age, child weight and height) were reviewed for biologically plausible values based on WHO standards.

Anthropometric data were converted to Z-scores (Height-for-Age, Weight-for-Age) using WHO Anthro software version 3.2.2. Outliers with biologically implausible Z-score values (e.g., HAZ <– 6 or > +6) were excluded from the analyses.

2.10.3 Data Storage and Confidentiality

Each participant was assigned a unique identifier code to ensure anonymity. No personal identifiers (e.g., names, contact details) were entered into the dataset. Electronic data files were protected and stored on a secure, encrypted computer accessible only to the principal investigator and data analysts.

Physical documents, including consent forms and questionnaires, were stored in a locked cabinet in the office of the corresponding author within the Department of Community Medicine, Faculty of Clinical Sciences, Rivers State University. These will be retained for a minimum of five years in compliance with institutional data retention policies.

2.10.4. Data Sharing

Data from this study were not publicly available due to ethical restrictions, but may be made available on reasonable request to the corresponding author.

2.11 Data Analyses

Data were entered into Microsoft Excel 365 and exported to SPSS version 27.0 for analyses. Descriptive statistics such as means, standard deviations, and proportions were used to summarise variables. Chi-square tests and t-tests were used to assess associations between maternal characteristics and compliance. Multivariate logistic regression was performed to identify independent predictors of adherence. The WHO Anthro software version 3.2.2. was used for anthropometric Z-score calculations and classification of nutritional status. Statistical significance was set at $p < 0.05$.

3 Results

3.1 Sociodemographic Characteristics of Mothers:

The study included 410 mothers with a mean age of 29.6 ± 5.4 years. The majority (63.4%) had attained at least secondary education, and a substantial proportion (76.1%) were multiparous. 55.2% of respondents reported monthly earnings less than ₦40,000. Most mothers (87.1%) were married, and 76.1% were multiparous (Table 1).

3.2 Maternal Feeding Knowledge and Compliance

Over half of the mothers (58.5%) demonstrated high knowledge scores (≥75%) based on WHO IYCF indicators. Knowledge assessed included exclusive breastfeeding, complementary feeding, meal frequency, and food diversity. Good knowledge was particularly reported among mothers with tertiary education and those regularly attending PHC-based health education sessions (Table 2).

3.2.1 Compliance with Recommended Feeding Practices

Despite the relatively high knowledge levels, only 51.7% of mothers were fully compliant with age-appropriate IYCF guidelines compared to 48.3% who were non-compliant (Table 2; Figure 1). Compliance was assessed based on reported feeding behaviours in the past 24 hours and aligned with WHO-recommended practices. Notable gaps included early introduction of solid foods (among infants <6 months), low dietary diversity in complementary feeding, and inadequate meal frequency.

3.3 Child Nutritional Status

Anthropometric assessment showed that 29.8% of children were stunted (HAZ <-2 SD), 18.2% were underweight (WAZ <-2 SD), and 52.0% had normal nutritional status (Figure 2). The distribution of stunting was higher among children whose mothers had lower education levels and who lived in food-insecure households.

3.4 Mean LAZ Scores by Compliance Status

Children of compliant mothers had significantly higher mean Length-for-Age Z (LAZ) scores compared to those of non-compliant mothers ($p < 0.001$) (Figure 3). This reinforces the critical role of maternal practices in influencing linear growth and preventing chronic undernutrition. Children of compliant mothers had significantly better growth scores (Figure 3):

a. Mean LAZ for compliant group: –1.03 ± 1.12.

b. LAZ for non-compliant group: –1.72 ± 1.19.

c. t-test p-value: 0.003.

3.5 Multivariable Logistic Regression Analysis

After adjusting for confounders, logistic regression identified three key predictors of maternal compliance as high maternal knowledge (Adjusted Odds Ratio [AOR]=2.31; 95% CI: 1.54-3.46; p<0.001), secondary education or higher (AOR=1.87; 95% CI: 1.21-2.88; p=0.005), and household food availability (AOR=2.69; 95% CI: 1.76-4.10; p<0.001). Attendance at PHC follow-up visits showed a positive trend (AOR=1.45; 95% CI: 0.94-2.26) but did not reach statistical significance (p=0.084) (Table 3).

Table 1. Sociodemographic Characteristics of Mothers (N = 410)

Characteristic	Frequency (%)
Age (mean ± SD)	29.6 ± 5.4 years
Education Level	
No formal education	8.1
Primary education	28.5
Secondary education	39.0
Tertiary education	24.4
Marital Status	
Married	81.7
Single	12.2
Widowed/Divorced	6.1

Characteristic	Frequency (%)
Parity	
Primiparous	23.9
Multiparous	76.1

Table 2. Maternal Feeding Knowledge and Compliance

Variable	Frequency (%)
Knowledge Level	
Low	21.2
Moderate	26.3
High	52.4
Compliance with Recommended Feeding	
Compliant	51.7
Non-compliant	48.3

Table 3. Multivariable Logistic Regression Analysis

Predictor	AOR	95% CI	p-value
High knowledge score	2.31	1.54–3.46	<0.001
Secondary education or higher	1.87	1.21–2.88	0.005
Household food availability	2.69	1.76–4.10	<0.001
PHC follow-up attendance	1.45	0.94–2.26	0.084

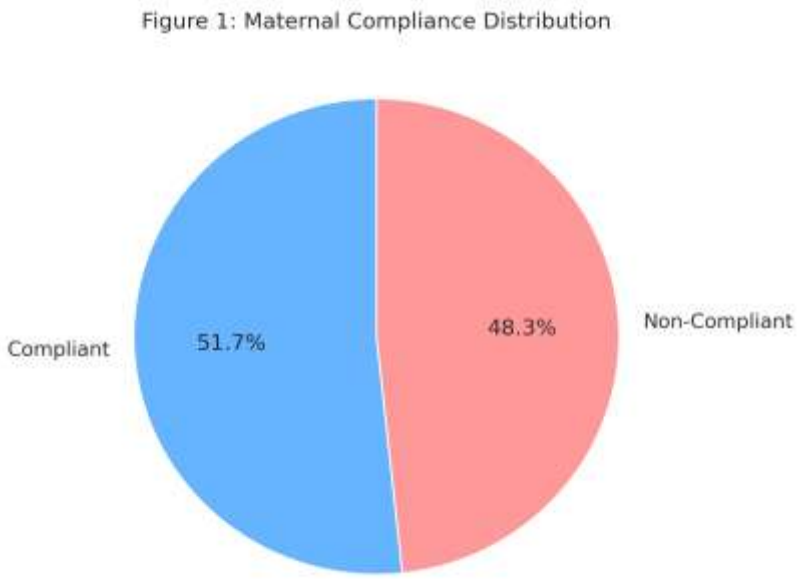

Figure 1. Distribution of Maternal Compliance with Feeding Guidelines

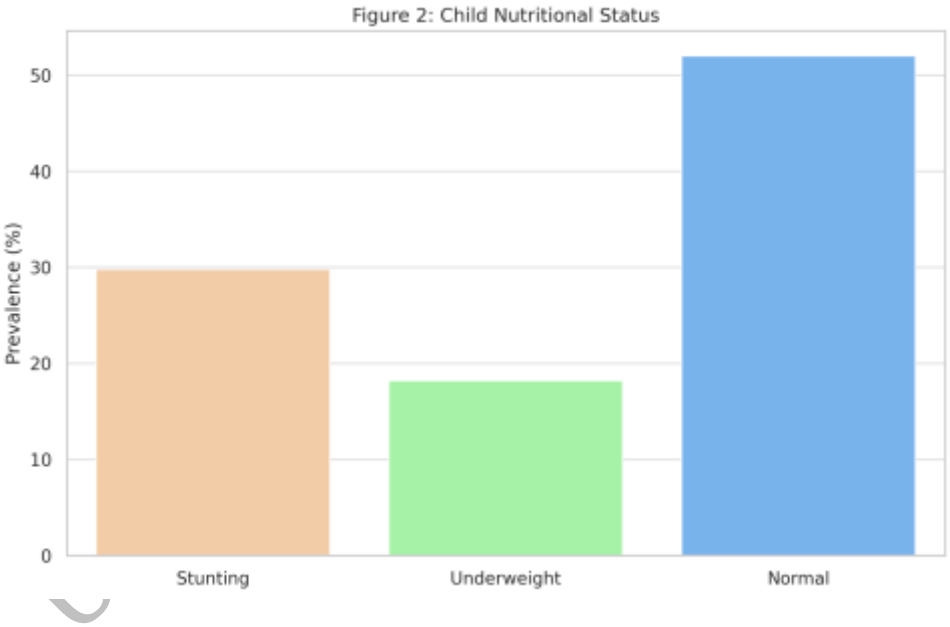

Figure 2. Child Nutritional Status Based on Anthropometric Indicators

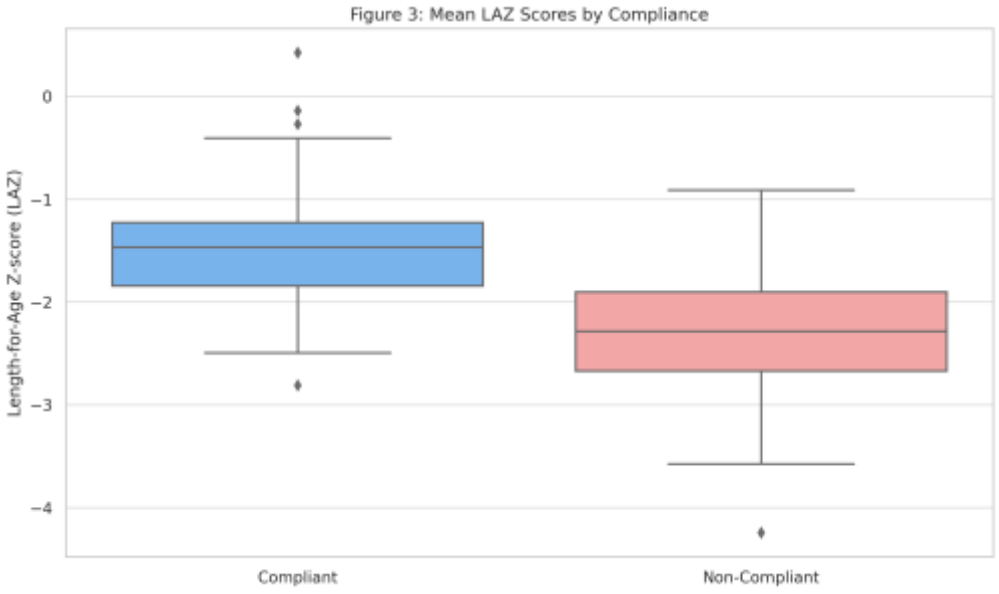

Figure 3. A box plot comparing mean LAZ scores between compliant and non-compliant groups.

4. Discussion

This study provided an important clinical epidemiological understanding of the determinants of maternal compliance with infant and young child feeding (IYCF) guidelines and their effect on the nutritional status of children within the primary healthcare (PHC) context of Rivers State. Despite the relatively high proportion of mothers with adequate knowledge of appropriate feeding practices, only a little over half adhered to these practices. This disparity shows the disconnect between acquiring knowledge and behavioural application, emphasising the role of structural and contextual barriers that prevent effective implementation of health information.

The high prevalence of stunting (29.8%) and underweight (18.2%) among children in the study underscored the persistent burden of chronic malnutrition in Nigeria, aligning with national demographic and health survey data.[10-13] Stunting is a key indicator of chronic nutritional deprivation, and its link with maternal non-compliance emphasised that early-life nutritional interventions are important for linear growth and are significantly influenced by maternal and contextual socioeconomic factors.[4,14]

Maternal knowledge was reported as a strong predictor of compliance, which is consistent with findings from Ethiopia, India, and Southeast Asia, where maternal education and knowledge were linked to improved feeding practices and anthropometric outcomes in children.[7,15] However, this study added nuance by demonstrating that knowledge alone is insufficient for behaviour change unless accompanied by enabling socioeconomic and structural support.

Education, as a proxy for socioeconomic status and health literacy, significantly influenced maternal feeding behaviour. Mothers who had at least a secondary education were nearly twice as likely to comply with IYCF guidelines as those without formal education. This supports a growing body of literature that shows maternal education as a key social determinant of child health.[3,5,16] Education enhances comprehension of health messages, facilitates better allocation of resources, and often correlates with higher utilisation of maternal-child health services.

Household food security also significantly influenced feeding compliance. Food insecurity limits the availability and variety of complementary foods necessary for dietary diversity, resulting in suboptimal feeding practices even among mothers who are knowledgeable. This finding aligns with recent systematic evidence, which showed that household food insecurity is significantly associated with stunting in children across diverse contexts.[17,18] Addressing food security requires both short-term and long-term strategies, including targeted supplementation programs, agricultural support, and social protection measures.[19]

Interestingly, while attendance at PHC follow-up visits showed a positive association with feeding compliance, it was not statistically significant. This may reflect different quality of nutrition counselling across facilities or a lack of time and individualised attention during routine immunisation sessions.[20] Furthermore, the association between compliance and improved mean Length-for-Age Z (LAZ) scores showed the clinical impact of maternal feeding behaviour on growth outcomes of the child.[8,21] LAZ scores, being sensitive indicators of long-term nutritional status, provide a reliable measure of the effectiveness of household-level feeding practices over time. This affirms the utility of LAZ as a critical outcome metric in clinical epidemiological studies of malnutrition.[4]

The forest plot of adjusted odds ratios (AORs) emphasises the predictive value of modifiable factors such as knowledge, education, and food availability, suggesting areas for intervention.[4] Targeted nutrition education alone may yield modest results unless this is complemented with household-level support mechanisms such as conditional cash transfers, food supplements, and women's empowerment programs.[22,23]

These findings have important implications for PHC policy and practice in Rivers State. Child's nutrition counselling services need to be standardised and integrated into routine PHC services for mothers with lower educational attainment and those residing in food-insecure households.

The high rate of compliance among educated mothers who also reported access to food resources reinforces the need for multi-pronged interventions. Evidence-based nutrition promotion efforts must include knowledge dissemination, community-based support groups, peer counsellors, and culturally tailored messaging to improve acceptance and sustainability of recommended feeding practices.[22]

Overall, this study reinforced that maternal compliance with IYCF guidelines is a complex, multifactorial behaviour influenced by both knowledge and contextual enablers.

Addressing only the educational component without tackling food insecurity, poor health system engagement, and broader social determinants may limit the impact of interventions.[24]

By adopting a clinical epidemiological approach, this study bridged the gap between public health and clinical care, providing evidence that can be translated into actionable, PHC-based interventions aimed at improving maternal and child health outcomes.[25]

Limitations of the Study

Several limitations must be noted, even though this study offered insightful clinical epidemiological information about maternal feeding habits and the nutritional outcomes of children:

1.Cross-sectional design

The study's cross-sectional design limits the capacity to conclude causality. Although correlations between maternal traits and feeding compliance were found, causality cannot be established without longitudinal research.

2. Self-Reported Information

The majority of the data on feeding habits and household characteristics came from maternal self-report, which can be subject to recall or social desirability bias, especially when it comes to reporting food frequency or exclusive breastfeeding.

3. Restricted Geographic Reach

The results may not apply to other parts of Nigeria with distinct cultural, socioeconomic, or health infrastructure contexts because the study was limited to a few PHCs in Rivers State.

4. Confounding variables that are not measured

Although they may have a substantial impact on feeding practices and child outcomes, factors like maternal mental health, household dynamics, and cultural feeding norms were not assessed.

5. Limitations of Anthropometric Measurement

Despite the use of standardised tools and processes, child cooperation and movement may have affected measurement accuracy, particularly in younger children.

6. Sampling bias and non-response

Systematic differences between respondents and non-respondents may have introduced bias into the results, although the study used a non-response rate.

Notwithstanding these drawbacks, the study provided a solid basis for creating interventions and regulations aimed at enhancing maternal adherence and the nutritional status of children in PHC environments.

Contribution to Knowledge

This study makes several important contributions to existing knowledge on maternal feeding practices and child nutrition within primary health care settings in Nigeria:

1. Strengthens clinical epidemiological evidence at the PHC level:
   The study applies a clinical epidemiological approach to maternal and child nutrition, providing evidence that links feeding practices directly with measurable child health outcomes in PHC facilities in Rivers State.

2. Identifies key modifiable predictors of feeding compliance:
   Maternal knowledge, secondary or higher education, and household food availability were shown to be independent predictors of adherence to recommended infant and young child feeding practices. These findings highlight clear intervention points for improving maternal behaviour.

3. Quantifies the knowledge-practice gap:
   Despite relatively high IYCF knowledge among mothers, only about half complied with recommended feeding guidelines. This demonstrates a significant gap between knowledge and practice and underscores the influence of socioeconomic and structural constraints.

4. Demonstrates the impact of maternal compliance on child growth:
   Children of compliant mothers had significantly better LAZ scores, providing robust local evidence that appropriate feeding practices contribute to improved linear growth and reduced chronic undernutrition.

5. Provides context-specific data for policy and PHC programming:
   The study adds current empirical data from Rivers State, an area with limited published evidence on maternal feeding practices and child nutritional outcomes. These findings support the need for strengthened PHC nutrition counselling and integrated food security interventions.

6. Highlights the need to improve the quality of PHC nutrition services:
   Although follow-up attendance showed a positive trend, its lack of statistical significance signals gaps in the consistency and effectiveness of nutrition counselling at the PHC level.

5 Conclusion and Recommendations

5.1 Conclusion

In primary healthcare (PHC) settings in Rivers State, this study explored the clinical epidemiological factors that influence maternal adherence to infant and young child feeding (IYCF) practices and the associated nutritional outcomes for children. The findings indicated that maternal knowledge, educational level, household food security, and healthcare engagement interact in a complex manner to shape feeding behaviours, which subsequently impact the nutritional status of children under five.

While over 50% of the mothers who participated in the survey demonstrated a high level of understanding regarding proper feeding techniques, this did not always translate into adherence. The fact that only roughly 51.7% of respondents followed the suggested IYCF practices suggested that knowledge is a necessary but insufficient prerequisite for behaviour change. The complexity of maternal decision-making in low-resource environments is highlighted by this knowledge-behaviour gap, where socioeconomic and structural limitations frequently take precedence over educational achievements.

The study also found that improved child nutritional indicators, especially Length-for-Age Z scores (LAZ), which are important indicators of chronic nutritional status, are strongly correlated with maternal compliance. The clinical significance of consistent, evidence-based feeding behaviour during early childhood was further supported by the significantly better anthropometric results of children whose mothers followed feeding guidelines.

Three independent predictors of maternal compliance were found using multivariate logistic regression: household food security, secondary or higher education, and high maternal knowledge. These results align with earlier research, but they place these predictors in a unique context within the PHC system of Rivers State. Although it was not statistically significant, attendance at PHC clinics showed a positive trend, indicating room for improvement in the primary care level's nutrition-related service delivery and content.

Despite the availability of PHC services and relatively high levels of maternal knowledge, the prevalence of stunting and underweight remains, revealing structural weaknesses in Rivers State's efforts to combat childhood malnutrition. These disparities are further worsened by sociocultural norms, poverty, food insecurity, and unequal access to health education. The study's conclusions emphasise the need for a comprehensive, multi-sectoral approach to improve child nutrition outcomes by empowering mothers and implementing systemic reforms. Ultimately, this study underscores the importance of employing a clinical epidemiological approach when examining the health behaviours of mothers and children. It offers valuable initial points for interventions that can be applied and scaled within existing healthcare systems by focusing on modifiable predictors in the PHC setting.

5.2 Recommendations

1. Include Nutrition Education Standards in PHC Services
Maternal-child health services at PHCs should include nutrition education as a required and standardized component. WHO-adapted IYCF modules should be used to train health workers, and job aids should be developed for consistent counselling during antenatal, postnatal, and immunisation visits.

2. Strengthening Health Worker Capacity through Continuous Training
Periodic in-service training in communication, behaviour modification techniques, and counselling skills is necessary for health professionals employed by PHC centres. To increase acceptability and trust, training should cover both technical knowledge and cultural sensitivity.

3. Encourage female education as a long-term approach to nutrition
As a long-term strategy to stop the cycle of malnutrition, policymakers and interested parties should fund education for girls. Maternal literacy and long-term health outcomes can be improved through literacy campaigns, school attendance incentives, and adult education initiatives.

4. Implement Conditional Cash Transfer and Food Voucher Programs
Government and partners should explore conditional cash transfers linked to maternal attendance at health and nutrition education sessions. Additionally, direct nutritional supplementation should be provided to food-insecure households to enhance compliance with feeding recommendations.

5. Peer Support Systems in the Community
Creating peer groups in the community, such as mother-to-mother support networks, can promote information exchange, support behavioural reinforcement, and offer mothers trying to follow feeding guidelines, both practical and emotional support.

6. Utilising Technology for Mobile Health (mHealth)
Voice messages, SMS-based nutrition advice, and mobile phone-based reminders can all support facility-level health education messages. Mothers with limited time or mobility can benefit greatly from mHealth.[26]

7. Involve Men in Family Decision-Making
Elders or spouses frequently have an impact on feeding decisions. Through community discussions and educational initiatives that question harmful cultural norms and encourage shared responsibility for child nutrition, interventions should involve men and important household members.

8. Use Agricultural and Social Protection Programs to Address Food Insecurity
Nutritional compliance is based on food security. Governments and NGOs should promote home gardening, micro-livestock farming, and agricultural input subsidies while

scaling up social protection programs for vulnerable populations.

9. Monitor and Evaluate Nutrition Services

PHC data systems should incorporate routine feeding practice and child growth monitoring. Mothers' opinions should also be regularly gathered to enhance counselling methods and service delivery.

Innovations in the Study

1. The study integrates clinical epidemiological methods into the assessment of maternal feeding practices, linking behavioural factors with anthropometric outcomes in PHC settings.

2. A multistage sampling approach across six PHC facilities provides a replicable model for nutrition research and improves representativeness.

3. The study quantifies the knowledge–practice gap in IYCF adherence, highlighting structural and behavioural constraints affecting maternal compliance.

4. It demonstrates a direct association between maternal compliance and improved LAZ scores, contributing new local evidence on determinants of linear growth.

5. The identification of modifiable predictors—maternal knowledge, education, and household food availability—offers actionable intervention targets for PHC nutrition programmes.

6. It generates context-specific data for Rivers State, addressing a major gap in local child nutrition evidence and informing PHC policy strengthening.

Further Research

This study sets the stage for future longitudinal and interventional research to assess the long-term impact of multifaceted strategies. Randomised controlled trials and implementation research should be prioritised to generate high-quality evidence for policy adoption.

Ethical Considerations

Ethical approval was obtained from the Rivers State Primary Health Care Management Board. Permission was also obtained from the Medical Officers of Health in Charge of the three LGAs and the officers in charge of the PHCs. Written or verbal informed consent was obtained from all participants. Confidentiality and anonymity were strictly maintained, and participants could withdraw at any stage without consequence.

Authors' contributions

Nduye Christie Tobin Briggs conceptualised, planned, collected the data for the study, and prepared the manuscript. Ifeoma Christiana Nwadiuto supervised data collection,

data entry, analysis, interpreted the results, and proofread the manuscript. All the authors read and approved the final version of the manuscript.

Competing interests

The authors have declared that no competing interests exist.

Conflict of interest

The authors declare no conflict of interest.

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